THAT WHICH IS CLAIMED

1. An artificial implant comprising at least one component formed of a biocompatible metal alloy, said biocompatible metal alloy being essentially free of carbide, nitride, and sigma second phase particles and having a hardness greater than about 40 R_c, a yield strength greater than about 120, and a grain size finer than about ASTM 10.

2. The artificial implant of Claim 1 wherein said biocompatible metal alloy is essentially free of all second phase particles.

3. The artificial implant of Claim 1 wherein said biocompatible metal alloy is a cobalt-base alloy.

4. The artificial implant of Claim 2 wherein said biocompatible metal alloy is a cobalt-base alloy.

5. The artificial implant of Claim 3 wherein said biocompatible metal alloy is a forged CoCrMo alloy.

6. The artificial implant of Claim 5 wherein said implant is an artificial joint implant and said at least one component comprises an articulating surface of said implant.

7. The artificial implant of Claim 6 wherein said at least one component comprises a ball component of said implant.

8. The artificial implant of Claim 5 wherein said implant is an artificial joint implant and said at least one component comprises a non-articulating component of an articulating implant.

9. The artificial implant of Claim 5 wherein said implant is a fracture fixation device.

10. The artificial implant of Claim 5 wherein said at least one component is selected from the group consisting of nails, screws, and plates.

11. The artificial implant of Claim 5 wherein said biocompatible metal alloy consists essentially of about 26 to about 28 weight percent chromium, about 5 to about 6 weight percent molybdenum, up to about 1 weight percent manganese, up to about 1 percent nickel, up to about 0.75 weight per iron, up to about 0.07 percent by weight carbon, up to about 0.25 weight percent nitrogen, less than about 0.10% Si, less than about 0.02% Ti, the remainder of the alloy constituting cobalt and impurities.

12. The artificial implant of Claim 11 wherein said implant is an artificial joint implant and said at least one component comprises an articulating surface of said implant.

13. The artificial implant of Claim 12 wherein said at least one component comprises a ball component of said implant.

14. The artificial implant of Claim 11 wherein said implant is an artificial joint implant and said at least one component comprises a non-articulating component of an articulating implant.

15. The artificial implant of Claim 11 wherein said implant is a fracture fixation device.

16. The artificial implant of Claim 15 wherein said at least one component is selected from the group consisting of nails, screws, and plates.

17. A biocompatible cobalt-base alloy comprising chromium and molybdenum, said alloy being essentially free of carbide, nitride, and sigma second phase particles.

18. The biocompatible cobalt-base alloy of Claim 17 said alloy being essentially free of any second phase particles.

19 The biocompatible cobalt-base alloy of Claim 17 wherein said alloy is a forged alloy.

20. The biocompatible metal alloy of Claim 19, wherein said alloy has a hardness greater than about 40 R_c.

21. The biocompatible metal alloy of Claim 20, wherein said alloy has a yield strength greater than about 120. KSI

22. The biocompatible metal alloy of Claim 21, wherein said alloy has a grain size, and a grain size finer than about ASTM 10.

23. The biocompatible metal alloy of Claim 1, wherein said alloy consists essentially of:

from about 26 to about 28 weight percent chromium;
from about 5 to about 6 weight percent molybdenum;
up to about 1 weight percent manganese;
up to about 1 weight percent nickel;
up to about 0.75 weight percent iron;
up to about 0.07 weight percent carbon;

the remainder of the alloy being cobalt and impurities.

24. The biocompatible metal alloy of Claim 23 further comprising;

nitrogen in an amount up to about 0.25 weight percent;

less than about 0.10% Si; and

less than about 0.02% Ti.

25. The biocompatible metal alloy of Claim 23, said alloy being essentially free of any second phase particles.

26. A method of manufacturing a cobalt-base alloy implant component comprising the steps:

providing a bar stock of biocompatible cobalt-base alloy; and

precision machining the bar stock under conditions sufficient to remove metal from said bar stock to form an implant component of predetermined shape without deforming the structure of said alloy sufficiently that the mean average increase in surface defects of a size above 5 micrometers is greater than 10 when said implant component is subjected to accelerated chemical aging by immersing the component in human synovial fluid inside a sealed pressure vessel and heating the pressure vessel to a temperature of 159°C, plus or minus 1°C, for 8.6 days.

27. The method of Claim 26 wherein said precision machining step is conducted without deforming the structure of said alloy sufficiently that the mean average increase in surface defects of a size above 5 micrometers is greater than 7.5 when said implant component is subjected to said accelerated chemical aging.

28. The method of Claim 26 wherein said precision machining step is conducted without deforming the structure of said alloy sufficiently that the mean average increase in surface defects of a size above 5 micrometers is greater than 3.5 when said implant component is subjected to said accelerated chemical aging.

29. The method of Claim 26 wherein said precision machining step is conducted without deforming the structure of said alloy sufficiently that the mean average increase in surface defects of a size above 5 micrometers is greater than 2 when said implant component is subjected to said accelerated chemical aging.

30. The method of Claim 26 wherein said precision machining step is conducted without deforming the structure of said alloy sufficiently that the mean average increase in surface defects of a size above 5 micrometers is greater than 1 when said implant component is subjected to said accelerated chemical aging.

31. The method of Claim 27 wherein said alloy consists essentially of:

from about 26 to about 28 weight percent chromium;

from about 5 to about 6 weight percent molybdenum;

up to about 1 weight percent manganese;

up to about 1 weight percent nickel;

up to about 0.75 weight percent iron;

up to about 0.07 weight percent carbon; the remainder of the alloy being cobalt and impurities.

32. The method of Claim 31 wherein said alloy further comprises nitrogen in an amount sufficient to increase hardness of said alloy up to about 0.25 weight percent, less than about 0.10% Si; and less than about 0.02% Ti.

33. The method of Claim 32 wherein said alloy is essentially free of carbide, nitride and sigma second phase particles.

34. The method of Claim 31, wherein said precision machining step is conducted by a technique selected from the group consisting of precision single point turning operations, chemical machining operations, electrochemical machining operations, laser beam machine operations, and electrochemical grinding operations.

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